

WHAT IS CLAIMED IS:

1. An image processing apparatus for forming a mosaic image by combining a plurality of material images, comprising:

5 input means for inputting a first image that is the
basis of a mosaic image;

storage means for storing the plurality of material images;

10 image characteristic acquisition means for dividing the first image into a plurality of areas, subdividing each of these areas into a plurality of subareas and obtaining a first image characteristic of each subarea;

designation means for designating an important area of the material images which form the mosaic image;

15 means for obtaining the first image characteristic and a second image characteristic of each of the plurality of material images in dependence upon the important area designated by aid designation means;

20 distance calculation means for calculating a difference between the first image characteristic and the second image characteristic to thereby calculate distances between each area of the first image and each of the material images; and

selection means for selecting a material image
25 corresponding to each area in dependence upon the
distances calculated by the distance calculation means.

2. The apparatus according to claim 1, wherein said image characteristic acquisition means acquires the first image characteristic by obtaining average R, G, B values of a plurality of pixel values which constitute the plurality of subareas.

3. The apparatus according to claim 1, further comprising means for dividing each of the plurality of material images into a plurality of subareas and obtaining the second image characteristic of each of these subareas.

4. The apparatus according to claim 1, wherein said distance calculation means calculates the difference upon enlarging weighing of the difference between the image characteristics corresponding to a subarea that has been designated by said designation means.

5. The apparatus according to claim 1, further comprising generating means for generating a mosaic image by pasting material images, which have been selected by said selection means, to corresponding areas.

6. An image processing apparatus for forming a mosaic

image by combining a plurality of material images stored in storage means, comprising:

input means for inputting a first image that is the basis of a mosaic image;

5 dividing means for dividing the first image into a plurality of image areas;

designation means for designating an important area of the material images which form the mosaic image; and

10 selection means for selecting material images corresponding to the image areas based upon the important area designated by said designation means.

7. The apparatus according to claim 6, wherein said selection means selects material images corresponding to 15 the image areas based on result of calculation performed upon weighting an image characteristic of the important area.

8. The apparatus according to claim 6, wherein the 20 image characteristic is average R, G, B values of pixel values which constitute the material images and image areas.

9. The apparatus according to claim 7, wherein the 25 result of calculation is a difference between image characteristics of the material images and image areas.

10. The apparatus according to claim 6, further comprising generating means for generating a mosaic image by pasting material images, which have been
5 selected by said selection means, to corresponding image areas.

5.5 A2 > 11. An image processing apparatus for forming a mosaic image by combining a plurality of material images,
10 comprising:
input means for inputting a first image that is the basis of a mosaic image;
storage means for storing the plurality of material images;
15 image characteristic acquisition means for dividing the first image into a plurality of areas and obtaining an image characteristic of each area;
weighting input means for inputting weighting information for selecting material images that form the
20 mosaic image;
distance calculation means for obtaining distances between the image characteristic of each area and image characteristics of each of the plurality of material images based upon the weighting information that has
25 been input by said weighting input means; and
selection means for selecting material images

corresponding to respective ones of the areas in dependence upon the distances calculated by said distance calculation means.

5 12. The apparatus according to claim 11, wherein said image characteristic acquisition means acquires the first image characteristic by obtaining average R, G, B values of a plurality of pixel values which constitute the plurality of subareas.

10 13. The apparatus according to claim 11, wherein said image characteristic acquisition means acquires the image characteristic by obtaining average values of luminance and color differences of each of a plurality 15 of pixels forming each area.

14. The apparatus according to claim 11, wherein said distance calculation means obtains differences between average values of luminance and average values of color 20 differences of pixels each area and corresponding average values of luminance and average values of color differences of pixels of each material image.

15. The apparatus according to claim 11, wherein the 25 weighting information is information indicating whether the distance between each area and each material image

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is to be obtained upon stressing luminance or upon stressing color difference.

16. The apparatus according to claim 11, further
5 comprising generating means for generating a mosaic image by pasting material images, which have been selected by said selection means, to corresponding image areas.

10 17. The apparatus according to claim 11, further comprising means for obtaining image characteristics of respective ones of the plurality of material images.

15 18. An image processing apparatus for combining a plurality of material images, which have been selected from a plurality of material images, to thereby create an image patterned after an original image, comprising:

20 designation means for designating a partial area in the original image;

dividing means for dividing the original image into a plurality of areas; and

25 similar-image selection means for preferentially selecting, from among the plurality of material images, a material image that most closely resembles the partial area designated by said designation means.

19. The apparatus according to claim 18, further comprising calculation means for calculating average density of each of the plurality of material images.

5 20. The apparatus according to claim 18, wherein said similar-image selection means has arithmetic means for calculating average densities of the areas; wherein material images to be assigned to the areas being decided in accordance with differences between 10 average densities of respective ones of the areas calculated by said calculation means and average densities of respective ones of the plurality of material images.

15 21. The apparatus according to claim 18, wherein said similar-image selection means has arithmetic means for calculating average densities of the areas; wherein material images to be assigned to the areas being decided in accordance with differences between 20 average densities, calculated by said arithmetic means, of areas determined not to include the partial area and average densities of respective ones of the plurality of material images not selected by said similar-image selection means.

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22. The apparatus according to claim 18, wherein said

~~designation means includes:~~

display means for displaying the original image;
and

means for designating a partial area of the image

5 displayed by said display means.

23. The apparatus according to claim 18, wherein said designation means has means for automatically discriminating and designating the partial area of the original image.

24. The apparatus according to claim 18, further comprising:

determination means for determining whether each of
15 the plurality of areas obtained by division by said
dividing means includes a partial area designated by
said designating means.

wherein said similar-image selection means selects, from among a plurality of material images not yet selected, material images that most closely resemble areas determined by said determination means to include the partial area.

25. The apparatus according to claim 24, further
25 comprising image selection means for selecting, from
among a plurality of material images not selected by

1 said similar-image selection means, material images that
2 most closely resemble areas determined by said
3 determination means not to include the partial area.

5 26. An image processing apparatus for combining a
6 plurality of material images, which have been selected
7 from a plurality of material images, to thereby create
8 an image patterned after an original image, comprising:

9 dividing means for dividing the original image into
10 a plurality of areas;

11 luminance calculation means for calculating average
12 luminance of each of the plurality of areas obtained by
13 division by said dividing means;

14 image selection means for selecting material images
15 corresponding to respective ones of the plurality of
16 areas based upon the average luminance of each of the
17 plurality of areas calculated by said luminance
18 calculation means and the luminance of each material
19 image; and

20 image pasting means for generating an image by
21 pasting the material images selected by said image
22 selection means to respective ones of corresponding
23 areas.

24 27. The apparatus according to claim 26, wherein said
25 image pasting means generates a monochrome image.

28. The apparatus according to claim 26, further comprising material-image luminance calculation means for calculating average luminance of each of the plurality of material images.

29. The apparatus according to claim 26, wherein said image selection means calculates differences between average luminances of respective ones of the plurality of areas and average luminances of the material images, and selects, as a material images corresponding to the areas, materials images for which the distances are smallest.

15 30. The apparatus according to claim 26, further comprising means for rendering a material image, which has been selected by said image selection means, into a monochrome image.

20 31. The apparatus according to claim 26, further comprising:

inspecting means for inspecting an image obtained by pasting by said image pasting means; and

means for determining, in dependence upon results
25 of inspection by said inspection means, whether the
image is to be rendered into a monochrome image.

32. The apparatus according to claim 26, wherein said image pasting means generates sepia-toned mosaic image.

5 33. An image processing method for forming a mosaic image by combining a plurality of material images, comprising the steps of:

dividing a first image that is the basis of the mosaic image into a plurality of areas;

10 subdividing each of these areas obtained by division into a plurality of subareas;

dividing a material image into a plurality of subareas;

15 weighting and calculating a difference between an image characteristic of the first image and an image characteristic of each of the subareas of each of the material images; and

selecting a material image corresponding to each area in dependence upon results of calculation.

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34. The method according to claim 33, wherein a material image corresponding to each area is a material image having an image characteristic that most closely resembles the image characteristic of this area.

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35. The method according to claim 33, wherein the image

characteristic is average R, G, B values of each of the plurality of subareas forming each area and the material image.

5 36. The method according to claim 33, further comprising a designation step of designating a subarea within the plurality of subareas.

37. The method according to claim 33, further
10 comprising a step of generating a mosaic image by
pasting material images, which have been selected, to
corresponding areas.

38. An image processing method for forming a mosaic image by combining a plurality of material images, comprising the steps of:

dividing an image that is the basis of the mosaic image into a plurality of areas;

obtaining an image characteristic of each area

20 obtained by division;

weighting and calculating distances between the image characteristic of each area and image characteristics of each of the plurality of material images; and

25 selecting material images corresponding to
respective ones of the areas in dependence upon results

of calculation.

39. The method according to claim 38, wherein a material image corresponding to each area is a material image having an image characteristic that most closely resembles the image characteristic of this area.

40. The method according to claim 38, wherein the image characteristic is average R, G, B values of a plurality of pixel values which constitute each area or each material image.

41. The method according to claim 38, wherein the image characteristic is average values of luminance and color differences of each of a plurality of pixels forming each area or each material image.

42. The method according to claim 38, wherein the calculation of the distances includes calculation for obtaining differences between average values of luminance and average values of color differences of pixels of each area and corresponding average values of luminance and average values of color differences of pixels of each material image.

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43. The method according to claim 38, wherein the

weighting is decided in dependence upon whether the distance between each area and each material image is to be obtained upon stressing luminance or upon stressing color difference.

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44. The method according to claim 38, further comprising a step of generating a mosaic image by pasting material images, which have been selected, to corresponding areas.

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45. The method according to claim 38, wherein the weighting is changed uniformly for the entire image that is the basis of the mosaic image or area by area.

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46. An image processing method for forming a mosaic image by combining a plurality of material images, comprising the steps of:

dividing an image that is the basis of the mosaic image into a plurality of areas;

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obtaining an image characteristic of each area obtained by division;

calculating distances between the image
characteristic of each area and image characteristics of
each of the plurality of material images upon stressing

25 luminance or color difference; and

selecting material images corresponding to

respective ones of the areas in dependence upon results of calculation.

47. The method according to claim 44, wherein a
5 material image corresponding to each area is a material image having an image characteristic that most closely resembles the image characteristic of this area.

48. An image processing method for combining a
10 plurality of material images, which have been selected from a plurality of material images, to thereby create an image patterned after an original image, comprising:
15 a designation step of designating a partial area in the original image;
a dividing step of dividing the original image into a plurality of areas;
a similar-image selection step of preferentially selecting, from among the plurality of material images, a material image that most closely resembles an area
20 determined at said determination step to include the partial area.

49. The method according to claim 48, further comprising a calculation step of calculating average
25 density of each of the plurality of material images.

50. The method according to claim 48, wherein said similar-image selection step has an arithmetic step of calculating average densities of the areas;
wherein material images to be assigned to the areas
5 being decided in accordance with differences between average densities of respective ones of the areas calculated at said calculation step and average densities of respective ones of the plurality of material images.

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51. The method according to claim 48, wherein said similar-image selection step has an arithmetic step of calculating average densities of the areas;
wherein material images to be assigned to the areas
15 being decided in accordance with differences between average densities, calculated at said arithmetic step, of areas determined not to include the partial area and average densities of respective ones of the plurality of material images not selected at said similar-image
20 selection step.

52. The method according to claim 48, wherein said designation step includes:
a display step of displaying the original image;
25 and
a step of designating a partial area of the image

displayed by said display step.

53. The method according to claim 48, wherein said designation step has a step of for automatically 5 discriminating and designating the partial area of the original image.

54 The method according to claim 48, further comprising
a determination step of determining whether each of the
10 plurality of areas obtained by division at said dividing
step includes a partial area designated at said
designating step,
wherein said similar-image selection step selects,
from among a plurality of material images not yet
15 selected, material images that most closely resemble
areas determined at said determination step to include
the partial area.

55. The method according to claim 54, further
20 comprising an image selecting step of selecting, from
among a plurality of material images not yet selected,
material images that most closely resemble areas
determined at said determination step to include the
partial area.

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56. An image processing method for combining a

plurality of material images, which have been selected from a plurality of material images, to thereby create an image patterned after an original image, comprising:

5 a dividing step of dividing the original image into a plurality of areas;

10 a luminance calculation step of calculating average luminance of each of the plurality of areas obtained by division at said dividing step;

15 a image selection step of selecting material images corresponding to respective ones of the plurality of areas based upon the average luminance of each of the plurality of areas calculated at said luminance calculation step and the luminance of each material image; and

20 57. The method according to claim 56, wherein said image pasting step generates a monochrome image.

25 58. The method according to claim 56, further comprising a material-image luminance calculation step of calculating average luminance of each of the plurality of material images.

59. The method according to claim 56, wherein said image selection step calculates differences between average luminances of respective ones of the plurality of areas and average luminances of the material images, and selects, as a material images corresponding to the areas, materials images for which the distances are smallest.

10 60. The method according to claim 56, further comprising a step of rendering a material image, which has been selected at said image selection step, into a monochrome image.

15 61. The method according to claim 56, further comprising:
an inspecting step of inspecting an image obtained by pasting at said image pasting step; and
a step of determining, in dependence upon results of inspection at said inspection step, whether the image is to be rendered into a monochrome image.

20 62. The method according to claim 56, wherein in said image pasting step, a sepia-toned mosaic image is generated.

63. A computer-readable storage medium storing a program which implements an image processing method for forming a mosaic image by combining a plurality of material images, comprising:

5 a program code module for dividing a first image that is the basis of the mosaic image into a plurality of areas;

a program code module for subdividing each of these areas obtained by division into a plurality of subareas;

10 a program code module for dividing a material image into a plurality of subareas;

a program code module for weighting and calculating a difference between an image characteristic of the first image and an image characteristic of each of the 15 subareas of each of the material images; and

a program code module for selecting a material image corresponding to each area in dependence upon results of calculation.

20 64. A computer-readable storage medium storing a program which implements an image processing method for forming a mosaic image by combining a plurality of material images, comprising:

a program code module for dividing an image that is 25 the basis of the mosaic image into a plurality of areas;

a program code module for obtaining an image

characteristic of each area obtained by division;

a program code module for weighting and calculating distances between the image characteristic of each area and image characteristics of each of the plurality of material images; and

5 a program code module for selecting material images corresponding to respective ones of the areas in dependence upon results of calculation.

10 65. A computer-readable storage medium storing a program which implements an image processing method for forming a mosaic image by combining a plurality of material images, comprising:

a program code module for dividing an image that is

15 the basis of the mosaic image into a plurality of areas;

a program code module for obtaining an image characteristic of each area obtained by division;

a program code module for calculating distances between the image characteristic of each area and image

20 characteristics of each of the plurality of material images upon stressing luminance or color difference; and

a program code module for selecting material images corresponding to respective ones of the areas in dependence upon results of calculation.

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66. A computer-readable storage medium storing a

program which implements an image processing method for forming a mosaic image by combining a plurality of material images, comprising:

- 5 a program code module for designating a partial area in an image that is the basis of the mosaic image;
- a program code module for dividing the image that is the basis of the mosaic image into a plurality of areas; and
- 10 a program code module for preferentially selecting, from among the plurality of material images, a material image that most closely resembles an area determined to include the partial area.

67. A computer-readable storage medium storing a program which implements an image processing method for forming a mosaic image by combining a plurality of material images, comprising:

- 15 a program code module for dividing an image that is the basis of the mosaic image into a plurality of areas;
- 20 a program code module for calculating average luminance of each of the plurality of areas obtained by division;
- a program code module for selecting material images corresponding to respective ones of the plurality of 25 areas based upon the average luminance of each of the plurality of areas calculated and the luminance of each

material image; and

a program code module for generating an image by
pasting the material images selected to respective ones
of corresponding areas.